REMARKS

Claims 1-12 were pending in the present application before this amendment as set forth above. Of them, claims 1-8, 11 and 12 were examined, and claims 9 and 10 were withdrawn as directed nonelected subject matter. By the amendment, claims 1-3, 4, 7 and 8 are amended, claims 4, 6, 11 and 12 and withdrawn claims 9 and 10 are canceled without prejudice.

In the May 18, 2009 Office Action, claims 1-8, 11 and 12 were rejected under 35 U.S.C. §101 and §112, 2nd paragraph. Furthermore, claims 1-8, 11 and 12 were rejected under 35 U.S.C. §103(a) as being unpatentable over Admitted Prior Art. Additionally, the claims were also objected to because of informalities. A substitute specification was also required.

Applicant very appreciates the Examiner's careful review of the application.

In response, as set forth above, claims 1-3, 4, 7 and 8 have been amended for better form.

Without acquiescing in the propriety of the Examiner's rejections and to facilitate the prosecution of the current application, claims 4 and 6, 11 and 12 and have been canceled, which makes the Examiner's rejections under 35 U.S.C. §101, §103 and §112 to claims 4, 6, 11 and 12 moot. Additionally, withdrawn claims 9 and 10 have also been canceled without prejudice. Applicant reserves every right in cancelled claims 4, 6 and 9-12 to file continuation/divisional applications.

Moreover, applicant has also amended the specification in proper idiomatic English and in compliance with 37 CFR 1.52(a) and (b). Applicant respectfully submits herewith a marked up copy of a substitute specification that marks all the changes made in the amendment, and also a clear copy of the substitute specification that includes all the changes made in the amendment.

Support for the amendments can be found in the disclosure, as originally filed. Applicant asserts that no new matter is added.

Any amendments to the claims not specifically referred to herein as being included for the purpose of distinguishing the claims from cited references are included for the purpose of clarification, consistence and/or grammatical correction only.

It is now believed that the application is in condition for allowance and such allowance is respectfully requested.

The following remarks herein are considered to be responsive thereto.

Claim Objections

The Office Action objected to claims 1-8 and 11-12 because of the following informalities: The claims recite broadband access server and access server interchangeably. The applicant was advised to use the same terminology throughout the claims. Appropriate correction was required.

In response, applicant has amended claims 1-3, 4, 7 and 8 using the same terminology "broadband access server" throughout these claims, according to the Examiner's suggestion. Accordingly, it is believed that the claim objections have been overcome.

Substitute Specification

In the Office Action, a substitute specification in compliance with 37 CFR 1.52(a) and (b) was required.

In response, applicant has amended the specification in proper idiomatic English and in compliance with 37 CFR 1.52(a) and (b). Applicant respectfully submits herewith a marked up copy of a substitute specification that marks all the changes made in the amendment, and also a clear copy of the substitute specification that includes all the changes made in the amendment. Applicant asserts that no new matter is added in the substitute specification.

Claim Rejections under 35 USC §101

The Office Action rejected to claims 1-8 and 11-12 under 35 USC §101 because the claimed invention was directed to non-statutory subject matter.

In response, applicant has amended the claims to conform with the provisions of 35 USC §101. Accordingly, applicant respectfully submits that the subject matter of claims 1-3, 4, 7 and 8 is statutory because the method recited in claims 1-3, 4, 7 and 8 is tied to particular apparatus/systems.

In particular, amended claim 1, among other things, recites a method that includes the step of "providing ***a fee calculation server*** in communication with ***the broadband access server*** for recording the amount of online time of the user and starting recording the online time of the user by the fee calculation service when receiving an instruction of the broadband access server after the user accesses the broadband access server and is authenticated successfully".

Therefore, amended claim 1 qualifies as a statutory process that ties to other statutory categories, such as ***the broadband access server*** and ***the fee calculation server***.

Accordingly, claims 2, 3, 4, 7 and 8, which depend from amended claim 1, are also directed to statutory subject matter under 35 U.S.C. §101.

Claim Rejections under 35 USC §112

Claims 1-8 and 11-12 were rejected under 35 U.S.C. 112, 2nd paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In response, claims 1-3, 4, 7 and 8 have been amended for better form to correct the informalities, as suggested by the Examiner. For example, the terms of "time charging" has been replaced with "recording an amount of online time". The terms "inner time" and "outer time" have been replaced with "inner time interval" and "outer time interval", respectively. Accordingly, it is believed that the claim rejections have been overcome.

Claim Rejections under 35 USC §103

The Office Action rejected claims 1-8 and 11-12 under 35 USC §103(a) as being unpatentable over Admitted Prior Art. Applicant respectfully traverses the rejections as follows.

As set forth above, amended claim 1 of the present invention, among other things, recites a method of recording an amount of online time of a user in a broadband access server that requires an inner time interval for monitoring a data flow of the user in a broadband server and an outer time interval for detecting an IDLE state outside the broadband access server. The inner time interval is shorter than the outer time interval.

However, as indicated in the Office Action, "Admitted Prior Art detects IDLE state in such way that a timer is directly configured such that data flow of a user is detected periodically at each interval so as to decide whether an increment between the user's data flow and the last check point is less than a threshold and that if the increment is not greater than the threshold, the user is considered offline, otherwise the user is considered online or downloading".

Obviously, the Admitted Prior Art fails to disclose, teach or suggest the inner time interval and the outer time interval and accordingly fails to disclose, teach or suggest the processing related to the inner time interval and the outer time interval, at least comprising step d and step e) recited in amended claim 1 of the present invention.

As discussed in the background technique of the present invention, the Admitted Prior

Art has at least the following defect: time intervals are fixed and often results may distort. FIG. 1B of the present invention is provided below for illustrating the defect.

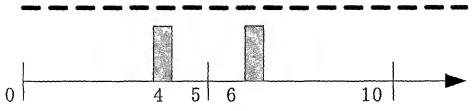

FIG. 1B

As shown in FIG. 1B, if the user's data flows are relatively large at the fourth and the sixth minute, but such flows are not large enough to exceed the threshold, the user will be forced to logoff at the tenth minute. In fact, his/her data flow at an interval of five minutes exceeds the threshold, so the result distorts. To solve the problem above, a traditional method of an idle state detection usually adopts increasing testing time to decrease the frequency of the distorted results.

Thus, the Admitted Prior Art is difficult to achieve a desirable precision for recording the online time of DHCP users. And the Admitted Prior Art does not disclose, teach or suggest any technical teaching in solving this technical problem.

However, in amended claim 1 of the present invention, the results of detecting on the data flow of the user in a later interval of time are saved one by one, which corresponds to that a queue of the user's data flow is observed through a data window, and the width of the window is width of the inner time interval for detecting the data flow assigned for the user. In this window, multiple detecting results are saved, the interval of each result is the inner time interval for detecting the data flow in the broadband access server. In such a way, the time precision in detection is based on the inner time interval and the idle state at outside of the broadband access server in detection is based on the outer time interval, and therefore the detection precision is enhanced and detection error is reduced.

Applicant respectfully submits that the Admitted Prior Art can not serve as the basis on which technical teaching is brought to the technical solution of amended claim 1 of the present invention. It is obvious that a person skilled in the art can not obtain the technical solution of amended claim 1 in the present invention without creative work.

Therefore, for at least the above reasons, amended claim 1 of the present invention is patentable under 35 USC §103(a) over the Admitted Prior Art.

Accordingly, amended claims 2, 3, 4, 7 and 8, which depend from now allowable amended claim 1, are also patentable for at least this reason.

CONCLUSION

Applicant respectfully submits that the foregoing Amendment and Response place this application in condition for allowance. If the Examiner believes that there are any issues that can be resolved by a telephone conference, or that there are any informalities that can be corrected by an Examiner's amendment, please call the undersigned at 404.495.3678.

Respectfully submitted,
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August 18, 2009

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Substitute Specification (Marked-up Version)

A METHOD OF RECORDING ONLINE TIME ~~CHARGING TO~~ OF A DHCP USER ~~ONLINE USERS~~ IN A BROADBAND ACCESS SERVER

FIELD OF THE INVENTION

The present invention generally relates to a method of ~~time charging for an~~ recording online time of a user in a server in communication technology, and ~~especially~~ more particularly relates to an improvement of a method of recording online time ~~charging for~~ of a DHCP online user in a broadband access server.

BACKGROUND OF THE INVENTION

With popularization of data services, there is little requirement of network knowledge for internet users. Because of its user-friendly interface and no requirement of sophisticated network knowledge for clients, an access mode of DHCP+WEB+RADIUS is becoming a very popular network mode provided by telecom service providers.

DHCP, an abbreviation of Dynamic Host Configuration Protocol, allows a server to dynamically assign an IP address and relevant configuration information of the server to a client. For such a DHCP, each client can obtain an IP address at start and occupy the IP address thereafter, thus a DHCP access mode uses mass address resources of telecom service providers. Furthermore, the DHCP access mode is unlike a narrowband access mode that can supply a ~~man~~human-machine interface with a perfect connection and disconnection mechanism. At present, no ~~flat rate of~~ fee charging based on client's online time is available in the market, and only a monthly flat rate is ~~used~~ applied for the clients. ~~On one hand, it wastes~~, which may waste a lot of ~~communication~~ resources. On the other hand, with concerns on service ~~level~~ levels and ~~return~~ returns on investment, service providers demand urgently technologies of accurate timing methods to realize the ~~flat rate~~ fee charging for DHCP users. When a DHCP user has been in an IDLE state for a period of time, that is, when the user's communication data flow has been lower than an assigned value for a period

of time, the user might be considered to be offline, and time ~~charging~~ recording for the user should be stopped. In other words, it needs to detect a user's IDLE state. Once the user is detected in the IDLE state, the user's connection with the network should be disconnected, and meanwhile, time ~~charging~~ recording of the user for online should be ceased. Therefore, login timing accuracy to DHCP users relies on ~~timeliness~~ the time and accuracy of detecting the IDLE state.

Conventional detection methods of the IDLE state are in such a way that a timer is directly configured such that data flow of a user is detected periodically at each interval so as to decide whether an increment between the user's data flow and the last check point is less than a threshold (assigned value); if the increment is not greater than the threshold, the user is considered offline; otherwise, the user is considered online or downloading.

The conventional technology, however, has the following defects:

1. Due to inaccuracy of fee charging methods, a user in an IDLE state may be considered as in a normal online state.

For example, as shown in FIG. 1A, provided that a time interval for IDLE detection is about 5 minutes, a user has a great deal flow at the first minute, and the flow does not exceed a threshold, the user will be forced to login off at the tenth minute according to a conventional algorithm. Such detection error is certainly too large, and can also make a waste in communication resources. To solve the problem, the time interval of detection is usually reduced in conventional methods for IDLE state detection.

2. Due to fixed time intervals, the state of a user may wrongly be detected.

For example, as shown in FIG. 1B, if the user's flow is relatively large at the fourth and the sixth minute, but such a flow is not large enough to exceed the threshold, the user will be forced to logoff at the tenth minute. In fact, the user's flow at an interval of five minutes exceeds the threshold, and therefore the state of the user may wrongly be detected. To solve the problem, testing time is usually increased in conventional methods for IDLE state detection so as to reduce frequency of wrong detection. Thus it is difficult for conventional methods to achieve a desirable precision for time charging to DHCP users.

Therefore, a heretofore unaddressed need exists in the art to address the aforementioned deficiencies and inadequacies.

SUMMARY OF THE INVENTION

The technical problem solved in the present invention is to provide a method of recording the online time ~~charging to~~ of a DHCP ~~users~~ user in a broadband access server, which reduces detection error, solves the problem in detecting IDLE state and satisfies the accuracy required.

In one aspect, the present invention ~~provides~~ relates to a method of recording the amount of online time ~~charging to~~ of a DHCP ~~online users~~ user in a broadband access server~~, wherein the~~. The broadband access server detects a data flow of an authenticated user by using an inner time interval that is shorter than an outer time interval and a flow threshold and establishing a circular linked list corresponding to the user, and ~~decides~~ deciding whether the user is in an IDLE state; if not, the broadband access server records the present flow value in the circular link list and continually detects the data flow of the user; otherwise the broadband access server determines the user to be in ~~an~~ the IDLE state. By reducing the time unit for the data flow detection, the detection error is reduced, the problem of detecting an IDLE state is solved, and the required precision is satisfied.

In one embodiment, the method comprises the following steps:

~~a)~~ (a) setting an inner time~~, an outer time~~ interval for monitoring a data flow of the user in the broadband access server, an outer time interval for detecting an IDLE state outside the broadband access server and a flow threshold for counting the data flow of the ~~users~~ user in the broadband access server, and the inner time interval being shorter than the outer time interval;

~~b) starting time charging to the users by~~(b) providing a fee calculation server in communication with the broadband access server for recording the amount of online time of the user and starting recording the online time of the user by the fee calculation service when receiving an instruction of the broadband access server ~~to the users sooner~~ after the ~~users access~~user accesses the broadband access server and ~~are~~ is authenticated successfully;

~~c) establishing a circular link list to each user for recording data flow of the user in the access server;~~

~~d) defining~~(c)establishing in the broadband access server a circular link list having a number of elements ~~in~~to the user for recording the data flow of the user, wherein the element number of the circular link list ~~as a multiple~~is the number of times of the outer time

interval to the inner time ~~in the access server~~ interval; and

~~e)~~ (d) repeatedly detecting the data flow of the user ~~according to the inner time~~ in the broadband access server at each inner time interval, and recording the detected data flow as a content of a head pointer of the circular link list in turn, until a difference between ~~data flow~~ the newly detected data flow and the content ~~rerecorded~~ recorded in the head pointer is not more than the flow threshold.

The method ~~is characterized in that, when the circular link list is not full, step e) further comprises the step of:~~

~~e1) examining data flow newly detected and the content of the head pointer, when the difference between the data flow newly detected and the content of the head pointer exceeds the flow threshold, saving the data flow newly detected as the content of the head pointer, and, meanwhile, moving the head and tail pointers down a position.~~

~~The method is characterized in that, when the circular link list is full, step e) further comprises the step of:~~

~~e2) examining data flow newly detected and the content of the head pointer element, when the difference between the data flow newly detected and the content of the head pointer exceeds the flow threshold, saving the data flow newly detected as the content of the head pointer, and moving the head and tail pointers down a position.~~

~~The method is characterized in that the method further comprises the steps of:f)~~ also includes the steps of deciding the user in ~~an~~the IDLE state in the broadband access server when the difference between the ~~data flow~~ newly detected data flow and the content recorded in the head pointer ~~does not exceed~~ is less than the flow threshold~~; and g)~~, and stopping recording the online time ~~charging to~~ of the user by the fee calculation service according to an instruction of the broadband access server ~~to the user~~.

~~The method is characterized in that the method further comprises the step of setting the user in an unauthenticated state in step f).~~

~~The method is characterized in that the method further comprises the step of setting a charging server for time charging to the online users in step b).~~

~~The method is characterized in that the time for the charging server to stop time charging is before an outer time corresponding to the inner time when the IDLE state is~~

~~detected.~~

In one embodiment, when the circular link list is not fully filled, step (d) further comprises the step of saving the newly detected data flow as the content of the head pointer, and moving the head and tail pointers down a position in the circular link list. When the circular link list is full, step c) further comprises the step of examining the newly detected data flow and the content of the head pointer element, when the difference between the newly detected data flow and the content of the head pointer exceeds the flow threshold, moving the head and tail pointers down a position in the circular link list, and saving the newly detected data flow as the content of the head pointer.

~~The method is characterized in that~~ In one embodiment, the inner time interval is about 30 seconds and/or the outer time interval is about 5 minutes.

In one embodiment ~~of the present invention~~, the broadband access server defines a circular link list corresponding to a login user, regarding each element in the circular link list, the content of the head pointer records a data flow that is detected in turn and when the assigned threshold is exceeded, and the tail pointer ~~points~~ is pointed to the next element of the circular link list, so that the data flow of the user can be monitored dynamically. In such a way, the ~~time~~ detection precision ~~in detection~~ of the online time of the user is based on the inner time~~, and therefore~~ interval, which is much less than the outer time interval. Therefore, the detection precision is ~~enhanced~~ improved and the detection error is reduced.

The technical solution and its advantage effects of the present invention will be obvious through describing of the preferred embodiments of the present invention in details below in combination with drawings attached.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1A and 1B are schematic diagrams of the data flow detection of a conventional method.

FIG. 2 shows a flow chart of a method of ~~time charging to DHCP~~ recording an amount of online ~~users~~ time of a user in a broadband access server according to one embodiment of the present invention.

FIG. 3 is a flow chart of detection for each inner detection period utilized in ~~a~~ the method ~~according to one embodiment of the present invention.~~ shown in FIG. 2.

FIG. 4 is a schematic diagram of data structure utilized in ~~a~~ the method ~~according to one embodiment of the present invention.~~shown in FIG. 2.

DETAILED DESCRIPTION OF THE INVENTION

A method of ~~time charging to DHCP~~ recording an amount of online ~~users~~ time of a user in a broadband access server according to one embodiment of the present invention comprises the following steps:

Firstly, an outer time interval and an inner time interval are configured in a broadband access server for detecting an IDLE state, which corresponds to a logout state or offline of a user. In general, the broadband access server ~~always~~ monitors user's data flow in all time, where a unit of an interval (inner time interval) for monitoring the user's data flow in the broadband server is in seconds, and a unit of an interval (outer time interval) for detecting an IDLE state at outside of the ~~system~~ broadband access server is in minutes. According to one embodiment of the present invention, the inner time interval for monitoring the user flow must be smaller than ~~a~~ the outer time interval for the IDLE state detection outside. For example, an outer detection time may be set to be about 5 minutes~~;~~, a threshold is about 10k, a time interval for detecting the user flow within the system, namely inner time interval, is about 30 seconds. Referring to FIG. 2, the time ~~charging~~ recording method for the DHCP ~~users~~user is further described as below.

At step 110: a user automatically obtains an IP address by the DHCP, is authenticated successfully, and then accesses the Internet; and the broadband access server timely informs a ~~charging service~~ fee calculation server to start recording the online time ~~charging to~~ of the user ~~accessed~~.

At step 120: the time ~~charging~~ recording starts from the time when the user is authenticated successfully. In general, passing through authentication for the user indicates that the user starts to accept the service provided by the service provider.

At step 130: the broadband access server calculates a number of elements in a circular link list based on the inner time interval and the outer time ~~configured~~ interval. The number of elements equals to the ratio of the outer time interval to the inner time interval. For example, in one embodiment, the ~~inner~~ outer time interval is set to be about 5 minutes and the ~~outer~~ inner time interval is set to be about 0.5 minutes. Accordingly, the number of elements

of the circular link list is equal to the ratio of 5 to ~~0.5~~,0.5 that is about 10. The broadband access server then records the ~~result~~ calculated result.

At step 140: the information on the user flow is timely updated in the circular link list.

At step 150: an IDLE state of the user is detected.

At step 160: the user in the IDLE state is forced to log out.

Referring to FIG. 3, the flow chart of detection for the circular link list is shown according to one embodiment of the present invention. The circular link list corresponds to an accessed and authenticated user. In a process of recording a corresponding user's data flow, a pointer is used to point a head pointer of the circular link list. The content of an element of the head pointer is corresponding to the value of the data flow before an IDLE detection interval, and the content of an element pointed by a tail pointer is the latest detected data flow result ~~detected~~.

The user's circular link list is not ~~full~~ fully filled at the time when the user just passes the authentication. At first, whether the number of elements filled in the circular link list is up to ~~10~~10, or not, is checked. If the number of filled elements is not up to 10, an element is added at each interval of the inner time interval, the content of the head pointer is filled with the detected data flow result ~~reported~~, the element newly added is added to the tail of the circular link list, and the tail pointer points to the newly added element ~~new added~~accordingly. Particularly, each ~~new~~ newly detected value of the data flow ~~value~~ is compared with the content of the head pointer in the circular link list~~, after~~. After compared, if the user is not in an IDLE state, such ~~new~~ newly detected data flow value is saved in the content of the head pointer. At the same time, the head and tail pointers move down one position in the circular link list, so as to ensure that the content of the element of the head pointer still is ~~flow~~the value of the data flow immediately before one IDLE detecting interval and the content of the element pointed by the tail pointer still is the latest detected data flow result ~~detected~~.

If the circular link list is ~~full~~ fully filled (up to 10), ~~new~~ newly detected data flow value ~~detected~~ is compared with the value of the element of the head pointer~~, if~~. If the difference between the ~~new~~newly detected data flow and the content of the element of the head pointer is greater than the assigned threshold, ~~10k~~ for example, 10k, the ~~new~~newly detected data flow value overwrites the value of the head pointer~~, and meanwhile~~. Meanwhile, the head and tail pointers ~~move~~ are moved down one position, so as to ensure that

the value of the element of the head pointer still is the ~~flow value~~ data flow value immediately before one IDLE detecting interval and the value of the element pointed by the tail pointer still is newly detected data flow result ~~detected~~.

If the difference between the ~~new~~ newly detected data flow and the content of the element of the head pointer is not greater than the assigned threshold, e.g., 10k, the user is considered being offline; and then the broadband access server sets the user in unauthenticated state, that is, the user is forced to logout. Meanwhile, the broadband access server informs RADIUS Server (a fee calculation server) of the user being offline and stopping time ~~charging~~ recording. The time when the user logs out is considered as the time ~~before~~ 5 minutes before.

In the embodiment, as shown in FIGS. 2 and 3, the broadband access server starts to query the user's data flow. ~~Referring back to~~As shown in FIG. 3, the flow detection for the circular link list includes the following steps: at step 300, the number of elements in a corresponding circular link list is obtained by detecting the user's data flow. At step 310, the number of elements is compared with those in the current circular link list. Then, at step 320, whether a desirable number of elements is achieved is determined. If not, the detection result is filled to the content of the head pointer ~~and~~. Meanwhile, the tail pointer ~~point~~ is ~~made~~pointed to the ~~new~~ newly detected element~~, meanwhile, the~~. The head and tail pointers ~~move~~are then moved down one position in the circular link list, and the data flow is detected for a next inner time interval at step 340. If the number of elements in the circular link list is greater than the desirable number, the element of the tail pointer and the content of the head pointer are compared at step 330. Then whether the difference between the element of the tail pointer and the content of the head pointer is greater than the assigned threshold is determined at step 350. If the difference is greater than the assigned threshold, the head and tail pointers are moved down one position in the circular link list, and the new data flow is filled to the content of the head pointer at step 360. If the difference is not greater than the assigned threshold, the user is set to be in unauthenticated state and forced to offline by the broadband access server at step 370. Then the system is returned to its detection state at step 380.

In one embodiment of the present invention, the detected results of the data flow of the user in the latest period of time are saved in turn, which corresponds to a queue of the user's

flow data observing through a data window in which the width of the data window is width of the inner time interval for detecting flow assigned for the user. In the data window, multiple detecting results are saved, and the interval of each result is corresponding to the inner time interval for detecting flow in the system, as shown is FIG. 4.

~~Accordint~~According to the present invention, when the data flow of the user is queried once, the data window goes forward one position. While moving, the data flow results at the two ends of the window are compared; if the difference between the flow results at the two ends of the window is not greater than the threshold, the user is considered in an IDLE state and forced to be offline~~; otherwise, new data~~. Otherwise, the newly detected data is filled into the content of the head pointer.

~~In~~Generally, in the conventional algorithms for realizing the IDLE detection~~, in general~~, the granularity of detection is ~~an~~a time interval assigned for detecting, such as 5 minutes. However, according to the method (algorithm) of the present invention, the detection granularity is the inner time interval for querying user's data flow in the ~~system~~broadband access server, such as 30 seconds, so the detection is more accurate.

It should be noted that the inner time and the outer time in the method of the present invention could be assigned in different values. The specific value mentioned above is corresponding to one embodiment of the present invention, which should not be used to limit the scope of the present invention.

It should be noted that, persons skilled in the art should understand that, the technical solutions of the present invention can be modified or substituted, without departing from the spirit and scope of the present invention, and all the modification and substitution fall in the scope of claims in the present invention.

ABSTRACT

A method of calculating online time of a DHCP user in a broadband access server~~DHCP user's on-line time~~ includes the steps of: (a) setting an inner time interval for monitoring a data flow of the user in the broadband access server, an outer time interval for detecting an IDLE state outside the broadband access server and a flow threshold for ~~said access server to count user's data flow, wherein~~counting the data flow of the user in the broadband access server, and the inner time ~~is~~interval being shorter than the outer time~~; (b) starting time charging to the users by~~ interval; (b) providing a fee calculation server in communication with the broadband access server for recording the amount of online time of the user and starting recording the online time of the user by the fee calculation service when receiving an instruction of the broadband access server ~~to the users sooner~~ after the ~~users access~~user accesses the broadband access server and ~~are~~is authenticated successfully; (c) establishing in the broadband access server a circular link list ~~to each user for recording data flow of the user in the access server; (d) defining~~having a number of elements ~~in~~to the user for recording the data flow of the user, wherein the element number of the circular link list ~~as a multiple~~is the number of times of the outer time interval to the inner time ~~in the access server; (c)~~interval; and (d) repeatedly detecting the data flow of the user ~~according to the inner time in the access server, and recording the~~in the broadband access server at each inner time interval, and recording the detected data flow as a content of a head pointer of the circular link list in turn, until a difference between ~~data flow~~the newly detected data flow and the content ~~rerecorded~~recorded in the head pointer is not more than the flow threshold.